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FIRST RECORDS OF THE ECHENEIDID FISH *REMILEGIA AUSTRALIS* (BENNETT) FROM CALIFORNIA, WITH MERISTIC DATA

BY

W. I. FOLLETT and LILLIAN J. DEMPSTER

Department of Ichthyology
California Academy of Sciences

During October 1958, nine specimens of the widely distributed but rarely collected whalesucker, *Remilegia australis* (Bennett), were taken from blue whales, *Sibbaldus musculus* (Linnaeus),[1] captured at 37° 20′ North Latitude, 123° 00′ West Longitude (about 20 miles south of the Farallon Islands), off San Mateo County, California. These are apparently the first authentic records of this species of Echeneididae from California. (A "California specimen" referred by Gudger (1926:18) to *Remilegia australis* could not have been of that species, since the specimen was stated to have only "18 lamellae.")

Eight of these specimens (California Academy of Sciences no. 26663), 126 to 380 mm. in standard length, were removed from 65- to 70-foot blue whales captured October 12; the ninth specimen (California Academy of Sciences no. 26664), 262 mm. in standard length (pl. 1, upper fig.), was taken from an 81-foot male blue whale captured October 16.

During September 1959, eight additional specimens were taken from

1. In using this name for the blue whale, we follow Grinnell (1933:213), Miller and Kellogg (1955:667), and Hall and Kelson (1959:837).

blue whales captured off central California: Three specimens (California Academy of Sciences no. 26766), 136 to 186 mm. in standard length, 10 to 12 miles off Santa Cruz; four specimens (Dale W. Rice field no. 146), 105 to 134 mm. in standard length, and one specimen (Dale W. Rice field no. 150), 399 mm. in standard length, 20 to 30 miles west of the Farallon Islands.

Although the whalesucker has been known for 120 years, there are only about 20 published records of specimens collected. Perhaps for this reason, *Remilegia australis* has been regarded as a rare species: "possibly the rarest form of the Echeneididae" (Gudger, 1926:10); "very rare" (Ui, 1932:253); "a rare species known from very scattered spots on the globe" (Whitley, 1949:23); "very rare" (Kamohara, 1958:61); "probably the rarest of the Remoras" (Smith, 1958:320). Krefft (1953:280) said that this species was only seldom found but that it was not at all rare on the coast of Peru, where he had seen it in the water several times on slain whales.

Synonymy

Several recent authors have referred this species to the genus *Remora* Gill, 1862. However, pending further study, we prefer to follow prevalent usage, which recognizes *Remilegia* Gill, 1862, as a distinct genus.

Echeneis australis Bennett, 1840, vol. 2:273 ("Australasian remora"; original diagnosis; type locality not indicated). Gill, 1864:60 (type of *Remilegia* Gill; *Echeneis scutata* Günther a synonym); 61 (critical notes). Waite, 1915:340 (synonymy; counts; measurements; description; color; references; critical notes; size; specimen from Adelaide, South Australia); pl. 11 (disc); 1921:160 ("sucker fish"; synonymy; record); fig. 263; 1923:185 ("sucker fish"; characters in key; diagnosis; record; two figs.). Kamohara, 1950:237 ("oukoban"; *Echeneis scutata* Günther a synonym; description; color; size; distribution; Tosa Province, Japan). Graham, 1953:341 (figs., copied); 342 (reference). Matsubara, 1955:1211 (*Echeneis scutata* Günther a synonym; generic name misspelled *Echelis*).

Remora australis. Bennett, 1840, vol. 1:165 ("sucking-fish"; size; observed at Raiatea, Society Islands). McCulloch, 1929: 382–383 (synonymy; distribution; Australia). Massmann, 1957:157 ("whale sucker"; specimen from Gloucester Point, Chesapeake Bay, Virginia). Mahnken and Gilmore, 1960:134 ("whale-sucker"; size; color; behavior; observed in Gulf of Mexico, Lat. 28° 10′ N. [misprinted "S"], Long. 93° 20′ W.); pl. 1 (fish clinging to *Stenella plagiodon*). American Fisheries Society Committee on Names of Fishes, 1960:48 ("whalesucker"; distribution).

Remilegia australis. Gill, 1864:61 (reference; critical notes; *Echeneis scutata* Günther a synonym). Lütken, 1875:42 (synonym of *Echeneis scutata* Günther). Jordan and Evermann, 1898:2268 (generic name only; characters in key); 2270–2271 (description; distribution; record; synonymy). Evermann and Marsh, 1900:301 (generic name only; characters in key). Gudger, 1926:10 (characters; record); 18 ([misidentification]); 22 (references). Nichols,

1930:370 (generic name only [misprinted *Remilegea*]; hosts; not recorded from Porto Rico). DE BUEN, 1934:398 (*Echeneis scutata* Günther a synonym); 402 (characters in key; generic allocation). BREDER, 1936:42–43 (size; brief description; color; specimen, in Bingham Oceanographic Collection, Yale University, New Haven, Connecticut, from between Panama and Lower California). WOODS, 1942:192 (brief description; size; count; distribution; records; reference; specimen, in Field Museum of Natural History, Chicago, Illinois, from within 50 miles of Corpus Christi, Texas). CARL and WILBY, 1945:29 ("whale sucker"; host; reference; specimens from Vancouver Island erroneously recorded as *Remora remora;* distribution; size; specimens in Provincial Museum, Victoria, British Columbia, and in University of British Columbia; "record appears to be the first for the Pacific Ocean"). CLEMENS and WILBY, 1949:42 (characters in key); 329 ("whale-sucker"; description; counts; color; size; diagnosis; hosts; records; specimens in Provincial Museum, Victoria, British Columbia); fig. 246. WHITLEY, 1947:149 (specimen from Bicton, near Fremantle, Western Australia); 1948:29 (record); 1949:22 (fig. of disc; specimen from Cape of Good Hope); 23 (diagnosis; color; records; distribution; hosts; size). KREFFT, 1953: 278–281 (synonymy; references; size; host; description; measurements; color; parasite; distribution; specimens, in Institut für Seefischerei, Hamburg, Germany, from off Peru, Lat. 6° 12′ S., Long. 82° 05′ W., and Lat. 10° 20′ S., Long. 80° 24′ W.); fig. 2 (lateral aspect); fig. 3 (dorsal aspect); fig. 4 (dentition). MATSUBARA, 1955:1211 ("ōkoban"; description; color; size; measurements; counts; "until now we had no record in Japan"; specimen, in Saito's collection, probably from coast of northern Japan); fig. 463a (disc); fig. 463b (lamina). HUBBS, 1956:70 (*Remora scutata* a synonym). MAUL, 1956: 9, 16 (generic name only; references); 12, 13 (specific name only; *scutata* a synonym); 18 (generic name only; characters in key). KAMOHARA, 1958:61 (*"ōkoban"; Echeneis scutata* Günther a synonym; distribution; Kochi Prefecture, Japan). SMITH, 1958:319–320 (synonymy; counts; measurements; description; color; size; host; distribution; "not before in the South Western Indian Ocean"; "the first specimen . . . from South Africa"; specimen from Algoa Bay, South Africa); fig. 1 (dorsal and lateral aspects). TORTONESE, 1958:336 (Mediterranean). MYERS, 1960:78 (known from north coast of New Guinea).

Echeneis scutata GÜNTHER, 1860a:401, 402, pl. 10B (original diagnosis; type locality, Ceylon); 1860b:381 (reference; description; measurements; size; color; distribution; specimens, in British Museum (Natural History), London, England, from Ceylon and India). GILL, 1862:239 (characters; *Remilegia*, new genus); 1864:60, 61 (synonym of *Echeneis australis* Bennett). LÜTKEN, 1875:28 (characters in key); 30 (reference); 31 (specimen in Copenhagen Museum); 32 (host); 42–43 (*Remilegia australis* a synonym; distribution; hosts; reference; critical note; size; description; measurements; color; specimen from Atlantic Ocean, Lat. 10° N., Long. 39° W.); 4, 5 (French abstract). GÜNTHER, 1880:461 (bulkiest species of *Echeneis;* size); 1886:326 (bulkiest species of *Echeneis;* size). PERUGIA, 1881:17 (references; description; color; specimen, in Collezione Centrale dei Vertebrati Italiani in Florence, Italy, from Adriatic Sea); colored pl. 2. FABER, 1883:232 (record). CARUS, 1893:661 (diagnosis; distribution; record; accidental at Trieste). NINNI, 1912:77 (reference; record). JORDAN, 1919:316 (orthotype of *Remilegia*). MCCULLOCH, 1929:382 (synonym of *Remora australis*). UI, 1932:253 ("ohokoban"; specific name misprinted *sucatata;* diagnosis; color; size; Kishu, Japan). DE BUEN, 1934:398, 399 (references; occurrence in Mediterranean doubtful; synonym of *Remilegia australis;*

distribution). Matsubara, 1955:1211 (synonym of *Echeneis australis* Bennett; type of *Remilegia* Gill; generic name misspelled *Echelis*). Kamohara, 1958:61 (synonym of *Remilegia australis*).

Remilegia scutata. Gill, 1862:239 (characters; *Remilegia*, new genus).

Remora scutata. Cadenat, 1953:680–683 (references; host; distribution; measurements; counts; description; color; characters; comparisons; specimen, in Laboratoire de Biologie Marine de l'Institut Français d'Afrique Noire, Gorée, from off N'gor, Sénégal, French West Africa); fig. 11; fig. 12 (disc). Munro, 1955:268 ("Ceylonese remora"; characters in key; reference; diagnosis; color; size; Ceylon); pl. 52. Hubbs, 1956:70 (synonym of *Remilegia australis*).

Echeneis naucrates [not of Linnaeus, 1758:261]. Günther, 1860b:384 (synonymy, in part: *Echeneis australis* Bennett only).

Remora remora [not of Gill, 1862:239]. Halkett, 1913:96 (in part: Sechart, British Columbia; specimen in Provincial Museum, Victoria, British Columbia). Schultz and DeLacy, 1936:138 (in part: Vancouver Island record).

Methods of Counting

All counts of the dorsal, anal, and caudal fins were taken from radiographs. In the dorsal and anal fins, the last two ray elements are counted as one ray. In the caudal fin, all branched rays plus the adjacent unbranched ray in each moiety of the fin are regarded as principal rays, and all other unbranched rays are regarded as procurrent. (See Hubbs and Lagler, 1958: 19–21.)

All rudimentary gill-rakers are counted, and the gill-raker in the angle of the arch is included in the count of the lower limb, as by Hubbs and Lagler (1958:24).

Characters

Except as stated below, the characters of our specimens correspond well to those noted in the literature (see Synonymy, *supra*). Our data, presented in table I, do not suggest any distinction between the 17 specimens taken from blue whales and a specimen (Scripps Institution of Oceanography no. 59–74) taken from a whitebelly dolphin.

Discal laminae. Modally 26 pairs, ranging from 25 to 28. The specimen with 28 pairs of laminae—one more pair than previously recorded for this species—is shown in plate 1, lower figure.

The published counts range from 24 (Bennett, 1840:273) to 27 (Günther, 1860a:401).

The number of denticles on the last pair of laminae ranges from 124 (61 on the left lamina, 63 on the right) to 358 (184 on left, 174 on right), being roughly correlated with the size of the specimen (as in other genera of Echeneididae; see Maul, 1956:11, 48).

TABLE 1

Standard length, disc length, and selected counts of 18 specimens of Remilegia australis

CAS=California Academy of Sciences; DWR=Dale W. Rice; SIO=Scripps Institution of Oceanography. Figures at left of hyphen represent count of left side of specimen; figures at right of hyphen represent count of right side of specimen.

Character	*DWR 146*	*DWR 146*	*DWR 146*	*CAS 26663*	*DWR 146*	*CAS 26766*
Standard length, mm	105	122	126	126	134	136
Disc length, mm	52	60	62	61	69	69
Counts						
Discal laminae	27	26	26	25	25	26
Dorsal soft-rays	25	24	24	25	25	26
Anal rays, total	25	23	23	25	25	25
Pectoral rays	24–24	24–24	24–24	23–23	23–23	23–23
Pelvic rays	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5
Caudal rays:						
Principal	9+8	9+8	9+8	9+8	9+8	9+8
Procurrent[1]	13/14	14/14	14/14	13/14	12/13	14/15
Gill-rakers:[2]						
1st arch:						
Anterior	2+17–2+16	2+15–2+16	3+14–2+15	2+17–2+14	2+19–2+17	2+18–3+17
Posterior	1+18–1+17	1+17–1+19	1+17–1+17	2+16–1+17	1+17–1+16	1+18–1+18
2nd arch:						
Anterior	2+18–2+18	2+16–2+16	2+16–2+17	2+16–2+17	2+17–2+16	2+17–2+17
Posterior	2+16–2+17	1+16–2+17	1+16–2+20	2+18–2+16	2+16–2+17	1+19–2+19
3rd arch:						
Anterior	3+17–2+17	2+17–2+16	2+17–2+17	2+16–2+17	3+19–3+18	2+18–2+20
Posterior	1+16–1+17	1+16–1+17	1+17–1+16	1+15–1+17	1+18–1+16	1+17–1+16
4th arch:						
Anterior	1+17–2+20	2+17–2+16	2+17–1+18	2+16–2+17	2+18–1+17	2+18–2+17
Posterior	1+13–1+14	1+13–1+14	1+13–1+16	1+12–1+13	1+13–1+13	1+13–1+14
Branchiostegals	10–10	10–10	10–10	9–9	10–9	10–10
Denticles on last pair of laminae	61–63	74–72	73–77	79–81	80–83	89–87
Vertebrae	12+15=27	12+15=27	12+15=27	12+15=27	12+15=27	12+15=27

1. Figures at left of diagonal represent count of upper series; figures at right of diagonal represent count of lower series.
2. All rudimentary gill-rakers are counted, and the gill-raker in the angle of the arch is included in the count of the lower limb.

TABLE I—Continued

Standard length, disc length, and selected counts of 18 specimens of Remilegia australis

CAS=California Academy of Sciences; DWR=Dale W. Rice; SIO=Scripps Institution of Oceanography. Figures at left of hyphen represent count of left side of specimen; figures at right of hyphen represent count of right side of specimen.

Character	*CAS 26766*	*CAS 26663*	*SIO 59-74*	*CAS 26766*	*CAS 26663*	*CAS 26663*
Standard length, mm	146	157	167	186	222	234
Disc length, mm	72	79	83	96	109	118
Counts						
Discal laminae	26	26	27	26	25	26
Dorsal soft-rays	23	26	26	25	23	25
Anal rays, total	25	26	24	25	24	25
Pectoral rays	23–22	24–24	24–24	23–23	24–22	23–23
Pelvic rays	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5
Caudal rays:						
Principal	9+8	9+8	9+8	9+8	9+8	9+8
Procurrent[1]	13/14	15/14	14/14	14/15	14/15	14/13
Gill-rakers:[2]						
1st arch:						
Anterior	2+15–2+17	2+17–2+17	1+16–2+17	2+17–2+17	2+15–2+15	2+17–2+17
Posterior	1+16–1+16	1+17–2+17	1+18–2+16	1+19–2+17	2+16–1+19	2+18–1+19
2nd arch:						
Anterior	2+17–1+16	2+17–2+17	2+17–2+15	2+19–2+17	2+17–2+20	2+19–3+19
Posterior	2+17–2+17	2+18–2+20	2+16–2+17	2+20–2+20	2+18–2+19	1+18–2+17
3rd arch:						
Anterior	2+17–2+16	2+18–2+17	2+16–2+16	2+19–2+19	2+18–2+17	2+18–2+17
Posterior	1+16–1+17	1+17–2+18	1+16–1+18	1+17–1+17	1+17–1+17	1+16–1+18
4th arch:						
Anterior	2+17–2+17	2+17–2+17	2+17–2+17	2+17–2+19	2+16–1+17	2+18–2+16
Posterior	1+13–1+14	1+13–1+14	1+12–1+13	1+13–1+13	1+12–1+13	1+13–1+13
Branchiostegals	10–9	10–10	10–10	10–10	10–10	10–10
Denticles on last pair of laminae	86–85	90–88	87–85	98–104	126–124	134–138
Vertebrae	12+15=27	12+15=27	12+15=27	12+15=27	12+15=27	12+15=27

1. Figures at left of diagonal represent count of upper series; figures at right of diagonal represent count of lower series.
2. All rudimentary gill-rakers are counted, and the gill-raker in the angle of the arch is included in the count of the lower limb.

TABLE I—Continued

Standard length, disc length, and selected counts of 18 specimens of Remilegia australis

CAS=California Academy of Sciences; DWR=Dale W. Rice; SIO=Scripps Institution of Oceanography. Figures at left of hyphen represent count of left side of specimen; figures at right of hyphen represent count of right side of specimen.

Character	*CAS 26663*	*CAS 26664*	*CAS 26663*	*CAS 26663*	*CAS 26663*	*DWR 150*
Standard length, mm	250	262	286	297	380	399
Disc length, mm	123	127	141	155	191	201
Counts						
Discal laminae	25	26	26	26	28	26
Dorsal soft-rays	25	25	25	24	25	26
Anal rays, total	23	25	24	24	24	25
Pectoral rays	21–23	24–23	23–24	24–23	24–23	23–23
Pelvic rays	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5
Caudal rays:						
Principal	9+8	9+8	9+8	9+8	9+8	9+8
Procurrent[1]	15/14	15/15	13/14	13/13	13/14	14/13
Gill-rakers:[2]						
1st arch:						
Anterior	1+16–2+15	2+16–2+16	2+14–2+16	2+19–2+17	2+16–2+17	2+17–2+16
Posterior	1+17–1+19	2+16–1+18	2+18–2+17	1+17–1+17	1+19–1+18	1+17–1+17
2nd arch:						
Anterior	2+17–1+19	2+18–2+17	2+17–2+17	2+18–3+16	2+20–3+17	2+18–2+17
Posterior	2+22–2+18	2+18–2+17	2+19–2+19	2+17–1+17	2+19–2+19	1+18–1+17
3rd arch:						
Anterior	2+17–2+18	2+17–2+18	2+16–2+16	2+17–2+20	2+17–2+18	2+18–3+17
Posterior	2+17–1+16	1+16–1+16	1+17–1+15	1+14–1+15	1+15–2+15	1+16–2+17
4th arch:						
Anterior	2+19–2+16	2+18–2+17	2+17–2+16	2+15–2+17	2+17–2+18	2+17–2+18
Posterior	1+14–1+14	1+12–1+12	1+12–1+13	1+11–1+13	1+13–1+12	1+15–1+14
Branchiostegals	10–10	10–10	10–10	10–10	10–10	10–10
Denticles on last pair of laminae	122–121	119–125	142–140	129–122	111–126	184–174
Vertebrae	12+15=27	12+15=27	12+15=27	12+15=27	12+15=27	12+15=27

1. Figures at left of diagonal represent count of upper series; figures at right of diagonal represent count of lower series.
2. All rudimentary gill-rakers are counted, and the gill-raker in the angle of the arch is included in the count of the lower limb.

Dorsal soft-rays. Modally 25, ranging from 23 to 26.

The published counts range from 20 (Smith, 1958:319) to 22 (Günther, 1860a:401); possibly they do not include some of the anterior rays, which—because of the thick integument of this fish—may have been overlooked.

Anal rays. Modally 25, ranging from 23 to 26. Pending further investigation, we regard the two anterior elements, which are embedded in thick integument, as unbranched rays rather than as spines.[2]

The published counts range from 21 (Günther, 1860a:401) to 24 (Bennett, 1840:273).

Pectoral rays. Modally 23, ranging from 21 to 24. The uppermost ray is invariably unbranched. We have not expressed the pectoral formulae in terms of branched and unbranched rays because, in the absence of alizarin preparations, the branching of the lowest rays in the smaller specimens does not appear satisfactorily determinable.

The published counts range from 1/20 (Cadenat, 1953:681) to 24 (Waite, 1915:340).

Pelvic rays. I, 5.

When Bennett (1840:273) wrote "Ventral 5," he had surely overlooked the concealed spine. When Günther (1860b:382) said of *Echeneis scutata,* "the ventrals are . . ., as in all the species of the genus [*Echeneis*], composed of one spine . . . and four soft rays," he apparently used the word "four" by inadvertence, since in his diagnoses of two other species which he referred to the genus *Echeneis,* he noted that the ventrals were composed of one spine and five soft-rays (Günther, *op. cit.*:377, 383).

Caudal rays. Principal: 9+8. Procurrent: modally 13 in the upper series and 14 in the lower series, ranging from 12 in the upper series and 13 in the lower series to 15 in the upper and 15 in the lower.

Since all our specimens have 17 principal caudal rays, it seems probable that the count of 20 by Bennett (1840:273) included the longest procurrent ray in one moiety of the caudal fin and the two longest procurrent rays in the other moiety. Counts of 13+6 and 19–20 were noted by Waite (1915: 340; 1923:185).

Gill-rakers. First arch (anterior aspect): modally 2+17, ranging from 1 to 3 on the upper limb and from 14 to 19 on the lower limb. The gill-rakers of the upper limb are small, round structures, which are difficult to discern because they are masked by the long gill-rakers at and immediately below the angle of the arch. Frequencies of counts of the gill-rakers on the anterior and posterior aspects of all arches are presented in table II.

2. In the order Echeneiformes, according to Berg (1940:495), there are "no spines in second dorsal and anal."

TABLE II

Frequencies of gill-raker counts in 18 specimens of Remilegia australis[1]
(Both sides counted)

	Upper limb			Lower limb									
	1	*2*	*3*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*
First arch:															
Anterior	2	32	2	....	....	....	3	6	9	15	1	2	....	....	....
Posterior	27	9	....	....	....	....	....	....	7	15	8	6	....	....	....
Second arch:															
Anterior	2	31	3	....	....	....	....	1	7	17	5	4	2	....	....
Posterior	7	29	....	....	....	....	....	....	6	11	7	7	4	....	1
Third arch:															
Anterior	....	32	4	....	....	....	....	....	7	15	9	3	2	....	....
Posterior	32	4	....	....	....	....	....	4	12	14	6	....	....	....	....
Fourth arch:															
Anterior	4	32	....	....	....	....	....	1	6	19	7	2	1	....	....
Posterior	36	....	....	1	7	18	8	1	1	....	....	....	....	....	....

1. All rudimentary gill-rakers are counted, and the gill-raker in the angle of the arch is included in the count of the lower limb.

The published counts are 4+14 (Waite, 1915:341), 1 at angle and 14 on lower limb (Cadenat, 1953:681), 2+1+14 (Matsubara, 1955:1212), and 0+15 (Smith, 1958:319).

BRANCHIOSTEGAL RAYS. Modally 10–10; 9–9 in one specimen, 10–9 in two specimens.

In the original description of *Echeneis australis,* Bennett (1840:273) noted, "Branchiostegous rays 10." The original diagnosis of the genus *Echeneis* included the character "Membr. branch. radiis X" (Linnaeus, 1758:260). Günther (1860b:376), however, regarded "branchiostegals seven" as a character of the genus *Echeneis* (to which he referred the present species; *op. cit.*:381, as *Echeneis scutata*). This statement of Günther's may have been accepted by those authors who noted seven branchiostegals as a character of the family Echeneididae (*e.g.,* Gill, 1883:565; Jordan and Gilbert, 1883:416; Jordan and Evermann, 1898:2266; 1905:494; Evermann and Marsh, 1900:301; Meek and Hildebrand, 1928:895; Fowler, 1959:498).

BRANCHIOSTEGAL MEMBRANES. In all our specimens, the left branchiostegal membrane overlaps the right. This asymmetry is in accordance with the general rule for all fishes in which the branchiostegal membranes are not united with each other or with the isthmus (Hubbs and Hubbs, 1945:279; Crossman, 1960:368).

SIZE. Our specimens range from 105 to 399 mm. in standard length.

The smallest example that we have found mentioned in the literature is

the 46-mm. specimen recorded by Lütken (1875:42). The largest of which we have found a published record is the 23-inch specimen mentioned by Günther (1860b:382); possibly this specimen provided the basis for the statements that this species attains a length of 2 feet and a weight of 8 pounds (Günther, 1880:461; 1886:326) and that it attains a length of 600 mm. (Kamohara, 1950:237; Smith, 1958:320).

Disc length. Averaging 0.50 standard length; ranging from 0.48 standard length to 0.52 standard length.

A disc length of 0.5 standard length was recorded by Woods (1942:192) and a disc length of 0.46 standard length, by Smith (1958:319). The disc length has been recorded as 2⅓ in total length (Günther, 1860a:401; Perugia, 1881:17) and as 2⅖ in total length (Lütken, 1875:42).

Color. In life, one specimen—the only one that we obtained alive—was blue with a narrow white margin on each fin. This specimen, which is shown in plate 1, upper figure, was photographed immediately after it had been preserved in formalin and before any observable change had occurred in the life colors. After months in alcohol, this specimen and 15 others are dark slaty blue and one specimen is brown. In life, the specimen from a whitebelly dolphin (see Hosts, *infra*) was reported to have been light slate gray with some hint of bluish background; after preservation in alcohol it has darkened to a bluish brown.

The life colors of the whalesucker have been recorded as brown (Günther, 1860a:401; 1860b:381; Lütken, 1875:43); dark brown with white edge on dorsal and anal fins (Matsubara, 1955:1212); brownish (Kamohara, 1950:237); uniform violet (Perugia, 1881:17); uniform dark slaty blue, edges of fins lighter, disc brown (Waite, 1915:341); dark slaty-blue (Whitley, 1949:23); deep marine blue (Cadenat, 1953:682); bluish white (Cadenat, 1953:682); grayish white (Ui, 1932:253); uniform slate gray, margins of dorsal and anal and tips of tail white (Breder, 1936:43); uniform gray (Mahnken and Gilmore, 1960:134); almost black, margins of dorsal, anal, and pectoral and upper and lower margins of caudal white (Smith, 1958: 320).

Hosts

Our 17 specimens were all taken from blue whales, *Sibbaldus musculus*. The specimen (Scripps Institution of Oceanography no. 59–74) from off San Roque Rock, Baja California, was taken from a whitebelly dolphin, *Delphinus bairdii* (John E. Fitch, personal communication).

Published records mention the following cetaceans as hosts of the whalesucker: dolphin (Lütken, 1875:42); sulphur bottom whale [blue whale] (Carl and Wilby, 1945:29); *Delphinus delphis* (?) (Cadenat, 1953:680);

sperm whale, *Physeter* (Krefft, 1953:278); porpoise (Smith, 1958:320); spotted porpoise, *Stenella plagiodon* (Mahnken and Gilmore, 1960:134). One individual was attached to an oar (Perugia, 1881:17).

Distribution

The present specimens were collected off California and Baja California.

Remilegia australis appears to be of world-wide distribution in temperate and tropical seas. It is known from as far north as Vancouver Island, British Columbia (Lat. 49° N.), and as far south as the Cape of Good Hope (Lat. 34° S.).

The localities from which we have found this species recorded may be listed as follows:

Pacific Ocean: Society Islands (Bennett, 1840, vol. 1:165). New Guinea (Myers, 1960:78). Japan (Ui, 1932:253; Kamohara, 1950:237; 1958:61; Matsubara, 1955:1211). British Columbia (Halkett, 1913:96). Between Lower California and Panama (Breder, 1936:42). Peru (Krefft, 1953:278).

Atlantic Ocean: Gulf of Mexico (Woods, 1942:192; Mahnken and Gilmore, 1960:134). Chesapeake Bay (Massmann, 1957:157). Mid-Atlantic (Lütken, 1875:42). Adriatic Sea (Perugia, 1881:17). French West Africa (Cadenat, 1953:680).

Indian Ocean: South Africa (Whitley, 1949:22; Smith, 1958:320). India (Günther, 1860b:381). Ceylon (Günther, 1860a:401). Western Australia (Whitley, 1947:149). South Australia (Waite, 1915:340).

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Plate 1

Upper figure. *Remilegia australis* (Bennett), whalesucker (CAS 26664), standard length 262 mm., from a blue whale captured October 16, 1958, off San Mateo County, California. Kodachrome by W. I. Follett.

Lower figure. Disc of a 380-mm. specimen of *Remilegia australis* (CAS 26663) with 28 pairs of laminae—one more pair than previously recorded for this species. Kodachrome by W. I. Follett.